



Hardware Reference Guide

Evo Workstation W8000

Document Part Number: 221474-002

September 2001

This guide is provided as a reference tool. The topics contained herein describe specific features and will assist you with installing additional components such as hard drives, memory, expansion boards, and processors.

Enhanced for accessibility.

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WARNING: Text set off in this manner indicates that failure to follow directions could result in bodily harm or loss of life.



CAUTION: Text set off in this manner indicates that failure to follow directions could result in damage to equipment or loss of information.

Rack Stability



WARNING: To reduce the risk of personal injury or damage to the equipment, be sure that:

- The leveling jacks are extended to the floor.
 - The full weight of the rack rests on the leveling jacks.
 - The stabilizing feet are attached to the rack in a single-rack installation.
 - The racks are coupled together in multiple-rack installations.
A rack may become unstable if more than one component is extended at a time, for any reason.
 - Extend only one component at a time.
-

Compaq Evo Workstation W8000
Hardware Reference Guide
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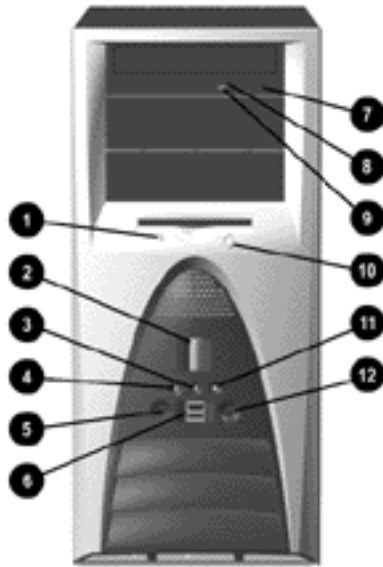
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Product Features

Standard Configuration Features

Features of the Compaq *Evo*™ Workstation W8000 may vary depending on your model. For a complete listing of the hardware and software installed in your workstation, run the INSPECT utility described in the *Troubleshooting Guide* on the *Reference Library* CD.

Front Panel Components

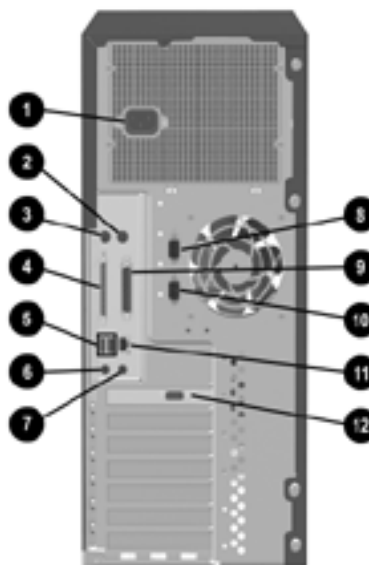


Front panel components

- | | |
|---|----------------------------------|
| ❶ Diskette drive activity light | ❷ CD-ROM eject button |
| ❸ Power button | ❸ CD-ROM emergency eject opening |
| ❹ Hard drive activity light | ❹ CD-ROM activity light |
| ❺ Power-on light | ❺ Diskette drive eject button |
| ❻ Headphone connector | ❻ Network link/activity light |
| ❼ Two universal serial bus (USB) connectors | ❼ Microphone connector |

*For additional information, see “Audio System” in this chapter.

Rear Panel Components



Rear panel components

- | | |
|---|-----------------------------|
| ❶ Power cord connector | ❷ Line-in audio connector |
| ❸ Mouse connector | ❸ Serial connector B |
| ❹ Keyboard connector | ❹ Parallel connector |
| ❺ 68-pin SCSI connector | ❺ Serial connector A |
| ❻ Two universal serial bus (USB) connectors | ❻ Ethernet connector |
| ❼ Line-out audio connector | ❼ Video (monitor) connector |

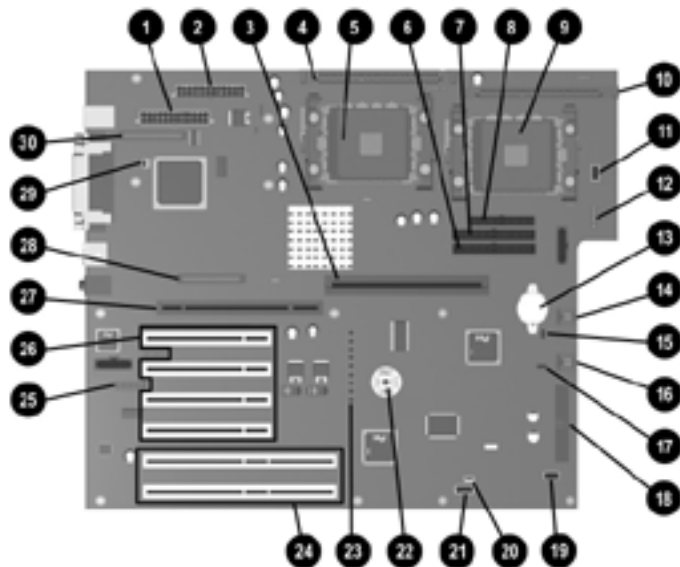
*For additional information, see “Audio System” in this chapter.

System Board Components

Your Evo Workstation W8000 includes the following devices:

- Integrated PCI-based audio
- Embedded Ethernet Network Interface Controller
- Dual-Channel SCSI controller

You may change the settings for these devices in Windows under Settings → Control Panel.



System board components

- | | |
|---|--------------------------------------|
| ❶ 24-position power connector | ❶❷ CD-ROM audio connector |
| ❷ 22-position power connector | ❶❸ Power-on password enable jumper |
| ❸ Memory expansion board socket | ❶❹ Front I/O board connector |
| ❹ Secondary Voltage Regulator Module (VRM) socket | ❶❺ Front fan connector |
| ❺ Secondary processor socket | ❶❻ Front speaker connector |
| ❻ Secondary Ultra ATA connector | ❶❼ 3COM Alert-on-LAN (AOL) connector |
| ❼ Primary Ultra ATA connector | ❶❽ CMOS push button switch |
| ❽ Diskette drive connector | ❶❾ Troubleshooting LEDs* |
| ❹ Primary processor socket | ❶❿ 64-bit, 66-MHz PCI sockets |
| ❶❶ Primary Voltage Regulator Module (VRM) socket | ❶❶ Serial port connector |
| ❶❷ Processor fan connector | ❶❷ 32-bit, 33-MHz PCI sockets |
| ❶❸ Hood sensor connector | ❶❸ 1.5V AGP Pro socket |
| ❶❹ Battery | ❶❹ 68-pin SCSI connector (ChannelA) |
| ❶❺ Auxiliary audio in connector | ❶❺ Rear fan connector |
| ❶❻ SCSI LED connector | ❶❻ 68-pin SCSI connector (ChannelB) |

*For more information on the hardware-based troubleshooting LEDs, see the Compaq Web site: http://www.compaq.com/support/techpubs/maintenance_guides/index.html

Audio System

Your workstation has an integrated audio solution that supports analog or digital external stereo speakers. The system is capable of autosensing the speaker type and outputting the correct signal. The autosensing is done by detecting if there is a mono jack plugged into the line-out connector.

If you are using a set of digital speakers that have a stereo jack, and you want the system to auto-switch to digital, you will need to use a stereo-to-mono adapter to get the autosensing to work. However, if you do not have a stereo-to-mono adapter present, then you can manually switch the audio signal from analog to digital. See “Solving Audio Problems” in the *Troubleshooting Guide* on the *Reference Library* CD for instructions on how to manually switch the audio signal for your operating system.

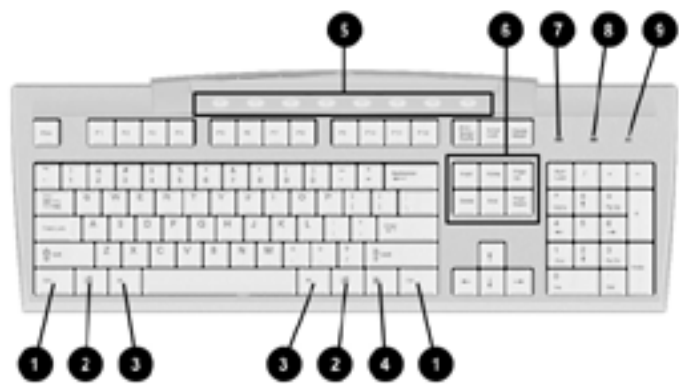
If you are using a headphone set that is mono, the system will attempt to switch to digital and you will experience “noise” or “silence.” This can be fixed by manually switching the signal to analog. See “Solving Audio Problems” in the *Troubleshooting Guide* on the *Reference Library* CD for instructions on how to manually switch the audio signal for your operating system.



If your analog speakers or headphones are not working, make sure that you are **not** using a mono adapter with autosensing enabled.

Keyboard

Your workstation ships with an Easy Access Keyboard. The following figure identifies the location of keyboard lights and special function keys.



Easy Access Keyboard components

Easy Access Keyboard		
Ref	Component	Function
❶	Ctrl key	Used in combination with another key; its effect depends on the application software you are using.
❷	Windows Logo Key	Used in combination with other keys to perform other functions (see “Windows Logo Key” later in this section).
❸	Alt key	Used in combination with another key; its effect depends on the application software you are using.
❹	Application key*	Used (like the right mouse button) to open pop-up menus in a Microsoft Office application; may perform other functions in other software applications.
❺	Easy Access keys	Provides quick and easy access to favorite Web sites, applications, and services.

Easy Access Keyboard (Continued)

Ref	Component	Function
⑥	Editing keys	Includes the following: Insert, Home, Page Up, Delete, End, and Page Down.  Holding down Ctrl + Alt + Delete allows you to restart your computer.
⑦	Num Lock light	Indicates whether the Num Lock feature is on or off.
⑧	Caps Lock light	Indicates whether the Caps Lock feature is on or off.
⑨	Scroll Lock light	Indicates whether the Scroll Lock feature is on or off.

*Available only in selected geographic regions.

Easy Access Software

Your Easy Access Keyboard Buttons are programmed to default assignments. The preinstalled Easy Access Software allows you to reprogram the Easy Access Buttons to reflect your personal preferences. The buttons can be reprogrammed to any program or service of your choice or to any Web site (URL).

Reprogramming the Easy Access Buttons

The Easy Access Keyboard icon is located on the Windows desktop status bar. Refer to the Readme-user.txt file for instructions about reprogramming the Easy Access Buttons.

Locking and Unlocking the Easy Access Buttons

The System Administrator can lock and unlock the Easy Access Buttons. Once locked, the buttons can only be reprogrammed by modifying the .bcf file. For administrative privileges, which require control of the Easy Access Button destinations, refer to the Readme-admin.txt file.

Easy Access Paper Icon Insert

The paper icon insert functions as a visual aid in identifying the programmed destination of each Easy Access Button. Whenever you reprogram an Easy Access Button, use the Paper Insert Template document to select and print an icon that reflects the new button assignment. The Paper Insert Template.doc is installed, by default, under C:\Program files\Compaq\Easy Access Keyboard.



For proper alignment, the spacing around the icons may require adjustment.

Windows Logo Key

Use the Windows Logo Key in combination with other keys to perform certain functions available in the Windows operating systems.

Windows Logo Key + F1	Displays a pop-up menu for the selected object
Windows Logo Key + Tab	Activates the next Taskbar button
Windows Logo Key + E	Launches Explore My Computer
Windows Logo Key + F	Launches Find Document
Windows Logo Key + Ctrl + F	Launches Find Computer
Windows Logo Key + M	Minimizes all open applications
Shift + Windows Logo Key + M	Undoes Minimize All
Windows Logo Key + R	Displays the Run dialog box

Special Mouse Functions

Most software applications support the use of a mouse. The functions assigned to each mouse button depend on the software applications you are using.

Serial Number Location

Each computer has a unique serial number located on the corner of the computer access panel and on the rear panel of the computer. Keep this number available for use when contacting Compaq customer service.

Hardware Upgrades

This chapter explains how to access the Evo Workstation W8000 by removing the workstation access panel and front bezel. It also explains how to install the following replacement hardware:

- Memory
- Drives
- Expansion boards
- Processors



Compaq recommends that you finish the setup procedures for the preinstalled software before you install any optional hardware or third-party devices that were not included with your workstation.

Installation Sequence

Follow this sequence of steps to ensure the proper installation of any optional equipment. Before you begin, observe the following precautions:



WARNING: To reduce the risk of personal injury from hot surfaces, allow the internal system components to cool before touching them.



WARNING: To reduce the risk of electric shock, fire, or damage to the equipment, do not plug telecommunications/telephone connectors into the network interface controller (NIC) receptacles.



CAUTION: Static electricity can damage the electronic components of the workstation or optional equipment. Before beginning these procedures, ensure that you are discharged of static electricity by briefly touching a grounded metal object.

1. Shut down the operating system properly, then turn off the workstation and any external devices. Disconnect the power cord from the grounded AC outlet.
2. Disconnect the keyboard, monitor, network cable, and other external equipment connected to the workstation.
3. Open the workstation by removing its workstation access panel. See “Removing the Workstation Access Panel” in this chapter.
4. If you are installing or removing drives in the front bays, see “Removing the Front Bezel” in this chapter.
5. Install any optional equipment, such as memory, drives, expansion boards, a processor, or battery. See the appropriate sections in this chapter or the appendix for installation instructions. Also refer to the documentation provided with the optional equipment.
6. Replace the front bezel and the workstation access panel, if necessary.
7. Reconnect the keyboard, mouse, monitor, network cable, and other external devices.
8. Plug the power cord into a grounded AC outlet.
9. Turn on the monitor, workstation, and any external devices you have installed.
10. Reconfigure the workstation, if necessary.
11. Test the workstation (optional) using the TEST utility.

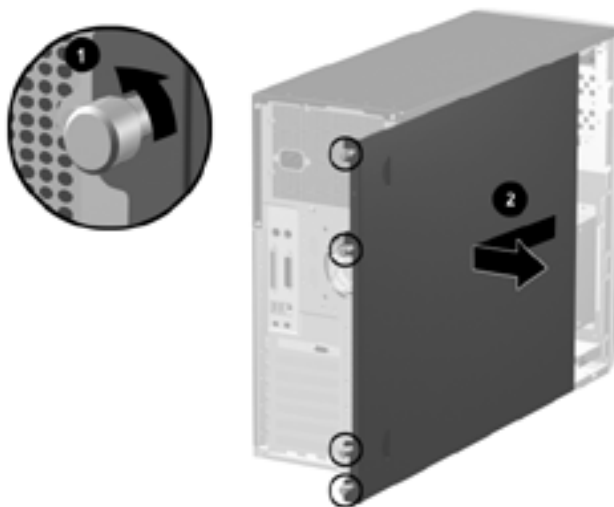
Removing the Workstation Access Panel



CAUTION: Never operate your workstation with the access panel removed. The access panel is required for proper cooling.

To remove the workstation access panel

1. Shut down the operating system properly, then turn off the workstation and any external devices. Disconnect the power cord from the grounded AC outlet.
2. To remove the workstation access panel, refer to the following illustration.



Loosening the four thumbscrews and removing the workstation access panel

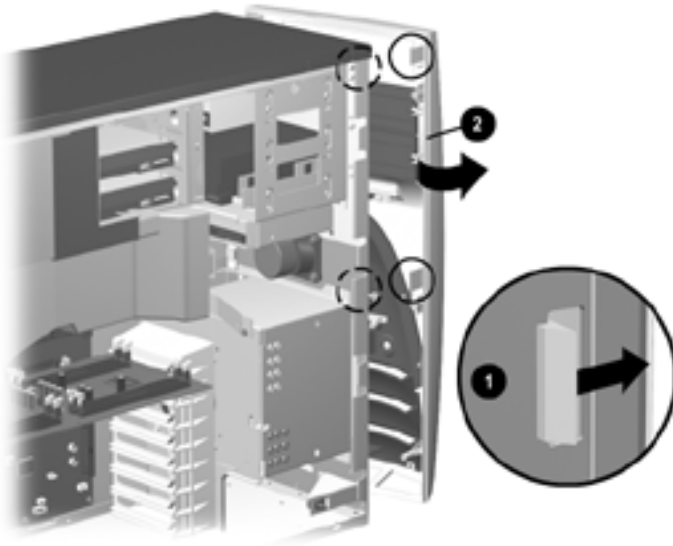


When replacing the workstation access panel, be sure to tighten all four thumbscrews.

Removing the Front Bezel

To remove the front bezel:

1. Shut down the operating system properly, then turn off the workstation and any external devices. Disconnect the power cord from the grounded AC outlet.
2. Remove the workstation access panel. See “Removing the Workstation Access Panel” in this chapter.
3. Remove the bezel:
 - a. Push in on the two front bezel release latches ❶.
 - b. Rotate the front bezel away from the chassis ❷ to release it.



Releasing the latches to remove the front bezel



When replacing the front bezel, ensure that the bottom hinge points are properly placed in the chassis before rotating the front bezel back into its original position.

Installing Additional Memory

The Evo Workstation W8000 has two Direct Rambus memory channels and uses Error Checking and Correcting (ECC) Direct Rambus Inline Memory Modules (RIMMS)

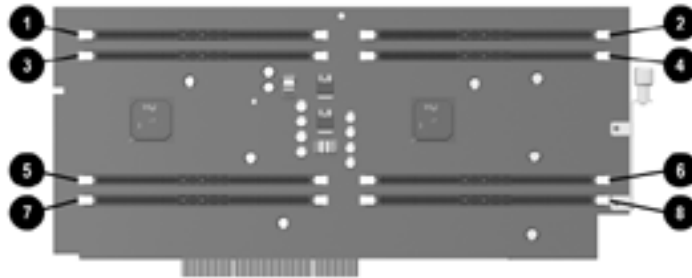
Dual Direct Rambus memory channels operate on the following three principles:

- **Dual channels maximize performance by doubling the speed at which data is transferred to and from memory, unlike single channel systems.** Memory hubs divide each main channel into two sub-channels. For example, channel A is divided into channel A-top and channel A-bottom, and channel B is divided into channel B-top and channel B-bottom. Each sub-channel consists of two RIMM sockets.
- **Dual channels operate in unison, not independently, thus identical RIMMs must be installed in pairs across channels.** For example, if you install a RIMM in RIMM socket 3 (channel B-top), you must also install an identical RIMM in RIMM socket 4 (channel A-top).
- **Dual channels must have electrical continuity for your system to boot.** For example, if you install identical RIMMs in RIMM sockets 3 and 4, but fail to install CRIMMs in RIMM sockets 1 and 2, the continuity will be broken and your system will not boot.

For more information on acceptable configurations, see “RIMM Installation Guidelines” and “Configurations for RIMM Installation” later in this chapter.

Memory Expansion Board

Your workstation ships with an eight RIMM socket memory expansion board (two RIMM sockets per memory channel).



Location of RIMM sockets

- ❶ RIMM Socket 1, Channel B-Top
- ❷ RIMM Socket 2, Channel A-Top
- ❸ RIMM Socket 3, Channel B-Top
- ❹ RIMM Socket 4, Channel A-Top
- ❺ RIMM Socket 5, Channel B-Bottom
- ❻ RIMM Socket 6, Channel A-Bottom
- ❼ RIMM Socket 7, Channel B-Bottom
- ❽ RIMM Socket 8, Channel A-Bottom

Removing the Memory Expansion Board

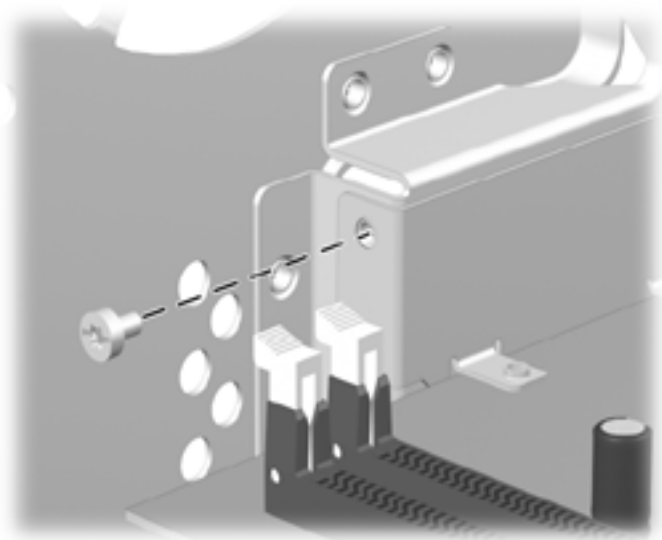
The memory modules are located on the memory expansion board. To remove the memory expansion board in order to install additional memory:

1. Shut down the operating system properly, then turn off the workstation and any external devices. Disconnect the power cord from the grounded AC outlet.
2. Remove the workstation access panel. See “Removing the Workstation Access Panel” in this chapter.
3. Remove the metal shipping bracket that extends above the memory expansion card. Return the screw to the side of the air plenum located at the front of the workstation.
4. Locate the memory expansion board that is connected to the system board.



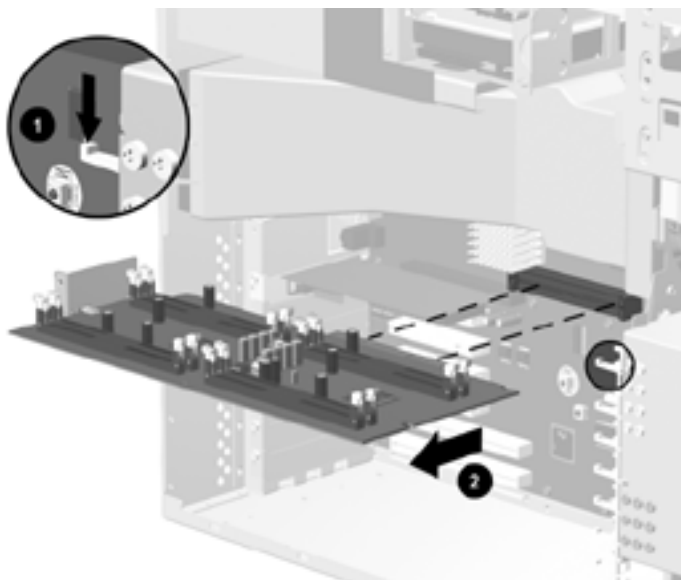
Memory expansion board

5. Remove the torx screw on the back of the metal slot cover that secures the memory expansion board to the memory expansion board socket.



Removing the torx screw on the back of the metal slot cover

6. To release the memory expansion board, press downward on the plastic release latch ❶ that holds the memory expansion board in the card guide.



Releasing and removing the memory expansion board from the memory expansion board socket

7. Carefully remove the memory expansion board from the memory expansion board socket ❷.
8. Locate the appropriate RIMM sockets and install the additional memory modules. See “RIMM Installation Guidelines” and “Configurations for RIMM Installation” later in this chapter.

RIMM Installation

RIMM Installation Guidelines



WARNING: To reduce the risk of personal injury when replacing or removing RIMMs allow the module being removed from the RIMM socket sufficient time to cool before touching it. RIMM temperatures can reach 212°F (100°C).



CAUTION: When handling a RIMM, do not touch any of the contacts. Doing so may damage the module.



CAUTION: Static electricity can damage the electronic components of the workstation or option boards. Before beginning these memory upgrade procedures, ensure that you are discharged of static electricity by briefly touching a grounded metal object.



This workstation can support either ECC memory or non-ECC memory. Compaq does not support mixing ECC and non-ECC memory in the same system. Doing so will cause the system to blink the NUMLOCK LED on the keyboard continuously and if a speaker is installed in the system, there will be a short beep followed by 2 long beeps. In addition, the system will not boot the operating system.

When installing RIMMs, you must follow the guidelines listed below:

- A RIMM can be installed only one way. Be sure to match the two key slots on the RIMM with the tabs on the RIMM socket. Push the RIMM down into the RIMM socket, ensuring that it is fully inserted and properly seated, and that the retaining arms are locked in place.
- CRIMMs must be installed in all empty RIMM sockets on channels that are used. The CRIMMs are removed when you populate the sockets with RIMMs. For examples of the correct configuration sequence, see “Configurations for RIMM Installation” in this chapter.

- Install RIMMs in pairs across both memory channels. Each RIMM socket populated with a RIMM or CRIMM on Channel A must be populated with an identical RIMM or CRIMM on Channel B. Use one of the four configurations listed under “Configurations for RIMM Installation” in this chapter.
- Do not exceed 32 Direct RDRAM devices on each Direct Rambus memory channel. A label on the RIMM will indicate the number and speed of Direct RDRAM devices on the RIMM.



The number of Direct RDRAM devices on a RIMM cannot be changed.

- Use 800-MHz RIMMs (or future speeds) only. Your system will not boot if slower speed RIMMs (i.e. 600 or 712-MHz) are installed.
- Do not mix RIMMs with different memory speeds. Performance will reflect the slowest speed RIMM.
- Use only RIMMs that have been tested and approved by Compaq. Not all RIMMs meet the Compaq standard for quality and reliability.



CAUTION: The previous guidelines must be followed when installing RIMMs, or your workstation will not function.



CAUTION: When handling a memory module, do not touch any of the contacts. Doing so can damage the module.

Configurations for RIMM Installation

When installing RIMMs on the memory expansion board, you must adhere to one of the following four configurations for optimal performance.



CRIMMs must be installed in all unpopulated RIMM sockets on channels being used.

Configuration 1: One Pair of RIMMs

Location	Contents
RIMM Sockets 1 and 2	CRIMM
RIMM Sockets 3 and 4	RIMM
RIMM Sockets 5 and 6	Empty
RIMM Sockets 7 and 8	Empty

Configuration 2: Two Pairs of RIMMs

Location	Contents
RIMM Sockets 1 and 2	CRIMM
RIMM Sockets 3 and 4	RIMM
RIMM Sockets 5 and 6	RIMM
RIMM Sockets 7 and 8	CRIMM

Configuration 3: Three Pairs of RIMMs

Location	Contents
RIMM Sockets 1 and 2	RIMM
RIMM Sockets 3 and 4	RIMM
RIMM Sockets 5 and 6	RIMM
RIMM Sockets 7 and 8	CRIMM

Configuration 4: Four Pairs of RIMMs

Location	Contents
RIMM Sockets 1 and 2	RIMM
RIMM Sockets 3 and 4	RIMM
RIMM Sockets 5 and 6	RIMM
RIMM Sockets 7 and 8	RIMM

Installing RIMMs



WARNING: To reduce the risk of personal injury, when replacing or removing RIMMs, allow the module being removed from the RIMM socket sufficient time to cool before touching it. RIMM temperatures can reach 212°F (100°C).



CAUTION: When handling a RIMM, do not touch any of the contacts. Doing so may damage the module.



CAUTION: Static electricity can damage the electronic components of the workstation or option boards. Before beginning these procedures, ensure that you are discharged of static electricity by briefly touching a grounded metal object

Before installing additional RIMMs, read “RIMM Installation Guidelines” in this chapter.



CRIMMs must be installed in all unpopulated RIMM sockets on channels being used.

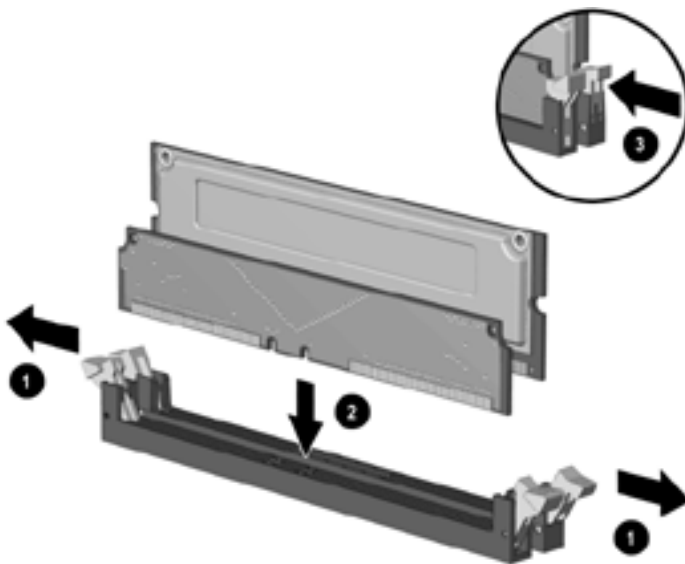
To install a RIMM:

1. Shut down the operating system properly, then turn off the workstation and any external devices. Disconnect the power cord from the grounded AC outlet.
2. Remove the workstation access panel. See “Removing the Workstation Access Panel” in this chapter.
3. Remove the memory expansion board. See “Removing the Memory Expansion Board” in this chapter.

4. Install the RIMM:
 - a. Press outward on the two RIMM socket retainer latches **1**.
 - b. Place the RIMM in the appropriate RIMM socket **2**. Ensure that the RIMM is fully inserted and properly seated.
 - c. Press inward on the two retainer latches **3** to secure the RIMM in the socket.



CAUTION: Be sure to follow the configuration guidelines or your system will not function



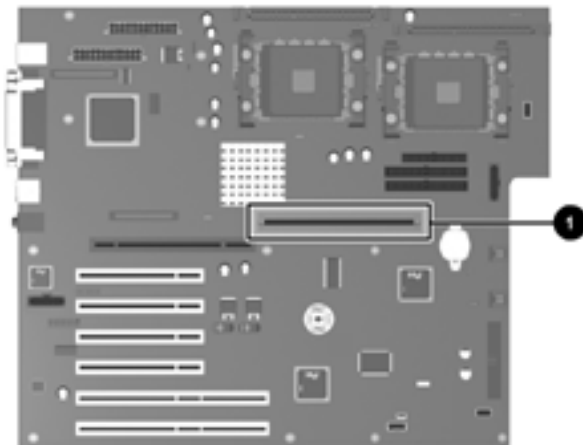
Installing a RIMM and a CRIMM

5. To reinstall the memory expansion board, see “Reinstalling the Memory Expansion Board” in this chapter.

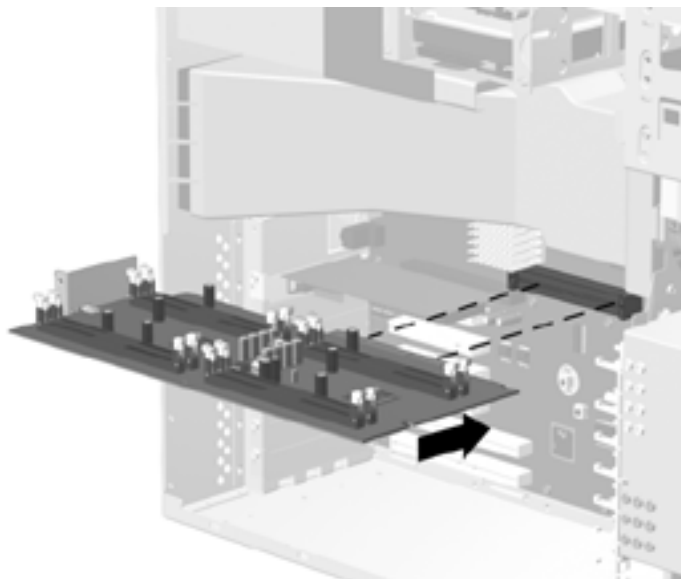
Reinstalling the Memory Expansion Board

To install a memory expansion board:

1. Place the memory expansion board into the memory expansion board socket.



Locating the memory expansion board socket on the system board



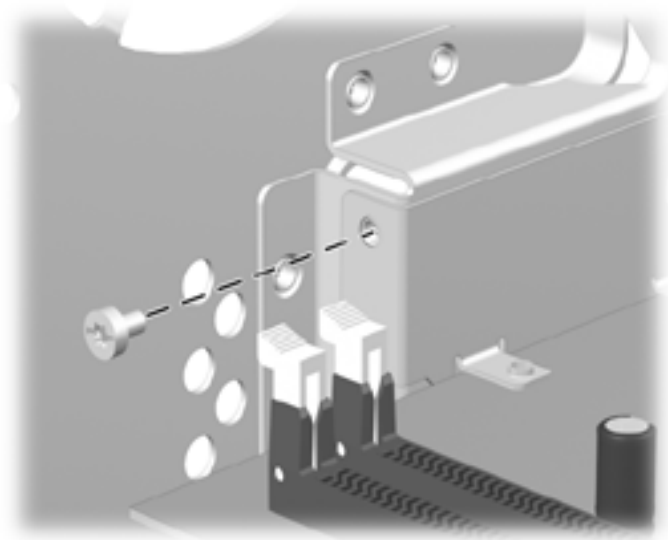
Installing a memory expansion board



When installing a memory expansion board, press firmly on the board so that the whole connector seats properly in the memory expansion board socket.

After you install the memory expansion board, make sure the board is engaged with the card guide.

2. Tighten the torx screw on the memory expansion board metal slot cover.



Securing the memory expansion board

3. Reassemble the workstation.

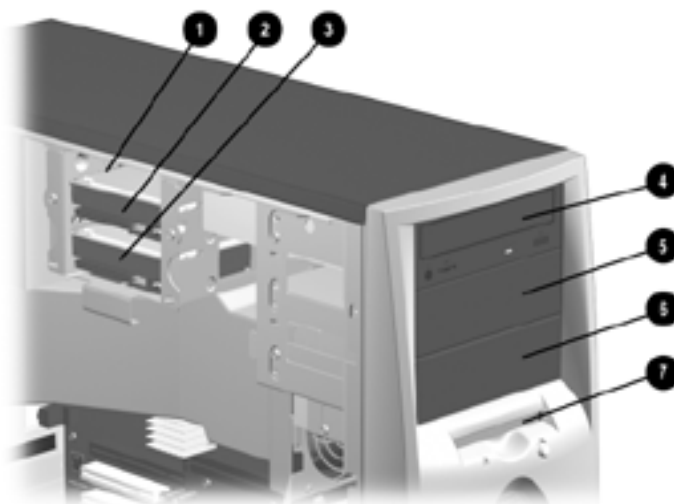
The workstation automatically recognizes the additional memory.

Installing Additional Drives

This section provides a description of the drive bay components. Instructions for removing a bezel blank and for installing or removing a drive are also included.

Drive Bay Components

Your workstation supports up to seven drive bays. See the following list for a description of the drive bay components.



Identifying drive bay components

Drive bays 1 through 3 are located in the 3.5-inch removable hard drive cage that is located inside the workstation. Drive bays 4 through 7 are located at the front of the workstation. The drives support various drive configurations.

Drive Bay Components

Bay	Drive Component
❶	Part of the removable hard drive cage. A 3.5-inch, third-height bay supports a 1.0-inch hard drive or a 1.6-inch hard drive.
❷	Part of the removable hard drive cage. A 3.5-inch, third-height bay supports a 1.0-inch hard drive. Bay 2 is not available when a 1.6-inch hard drive is installed in either bay 1 or bay 3.
❸	Part of the removable hard drive cage. A 3.5-inch, third-height bay supports a 1.0-inch hard drive or a 1.6-inch hard drive.
❹	A 5.25-inch, half-height bay that supports 1.0-inch or 1.6-inch storage devices. Either a CD-ROM drive or DVD-ROM drive is shipped in bay 4.
❺	A 5.25-inch, half-height bay that supports 1.0-inch or 1.6-inch storage devices.
❻	A 5.25-inch, half-height bay that supports 1.0-inch or 1.6-inch storage devices.
❼	A 3.5-inch, third-height bay that supports a 1.0-inch device. A standard 3.5-inch diskette drive is shipped in bay 7.
	An optional ZIP drive can be installed in bay 5 or bay 6.

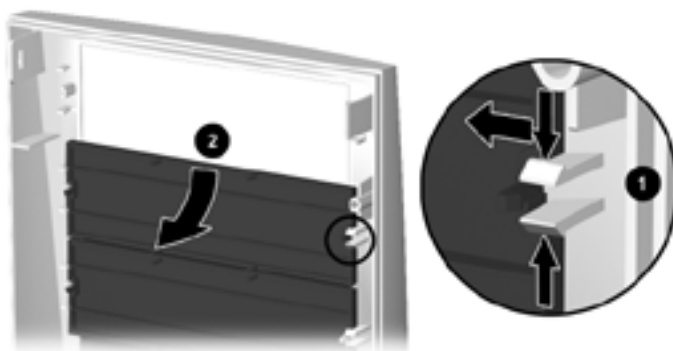
Preparing for Drive Installation

Remove the drive bezel blank before installing any removable media storage device, such as a tape drive, CD-ROM or DVD-ROM drive, or diskette drive, into an empty bay location.

Removing the Bezel Blank

To remove the bezel blank:

1. Shut down the operating system properly, then turn off the workstation and any external devices. Disconnect the power cord from the grounded AC outlet.
2. Remove the workstation access panel. See “Removing the Workstation Access Panel” in this chapter.
3. Remove the front bezel. See “Removing the Front Bezel” in this chapter.
4. Remove the bezel blank:
 - a. Pinch together the retainer snaps on the back of the front bezel ❶. This allows the bezel blank to move past the retainer snaps.
 - b. Rotate the bezel blank outward ❷, detaching it from the front bezel.



Removing the bezel blank from the front bezel

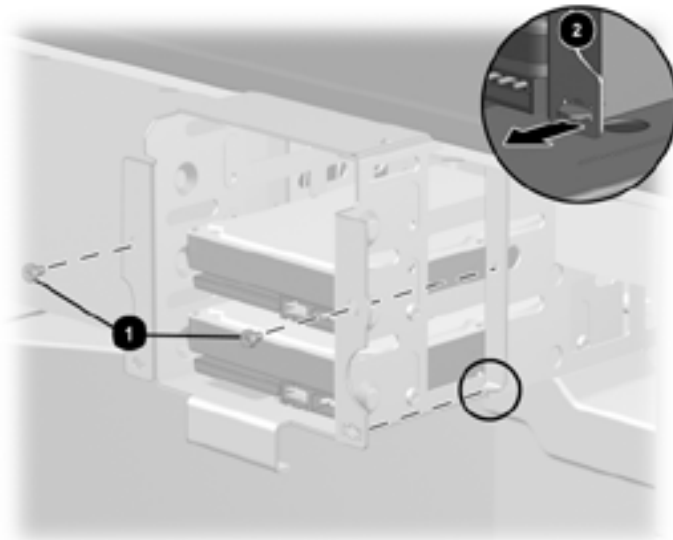
Removing and Replacing the Removable Hard Drive Cage

Drive bays 1 through 3 are located in the removable hard drive cage. This section provides information on how to remove and install the hard drive cage.

Removing the Removable Hard Drive Cage

To remove the removable hard drive cage

1. Shut down the operating system properly, then turn off the workstation and any external devices. Disconnect the power cord from the grounded AC outlet.
2. Remove the workstation access panel. See “Removing the Workstation Access Panel” in this chapter.
3. Remove the hard drive cage:
 - a. Remove the torx screws ❶ on the top of the cage.
 - b. Hold the tab ❷ and pull the cage up and out of the workstation chassis.



Removing the removable hard drive cage

Replacing the Removable Hard Drive Cage

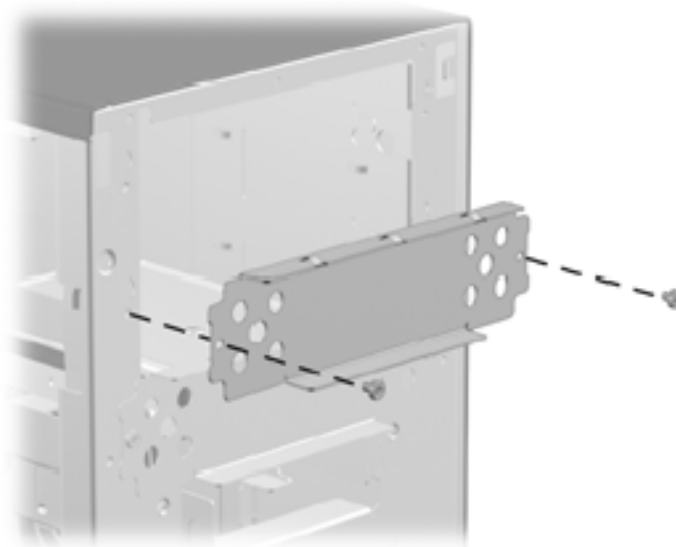
To replace the removable hard drive cage, reverse the steps in the previous section.

Removing the Cooling Shield

A cooling shield covers bays 5 and 6 to provide proper cooling and EMI protection. The cooling shield must be removed before installing a hard drive in either of these bay locations.

To remove a cooling shield:

1. Shut down the operating system properly, then turn off the workstation and any external devices. Disconnect the power cord from the grounded AC outlet.
2. Remove the workstation access panel. See “Removing the Workstation Access Panel” in this chapter.
3. Remove the front bezel. See “Removing the Front Bezel” in this chapter.
4. Remove the two torx screws holding the cooling shield to the chassis. See the following illustration.

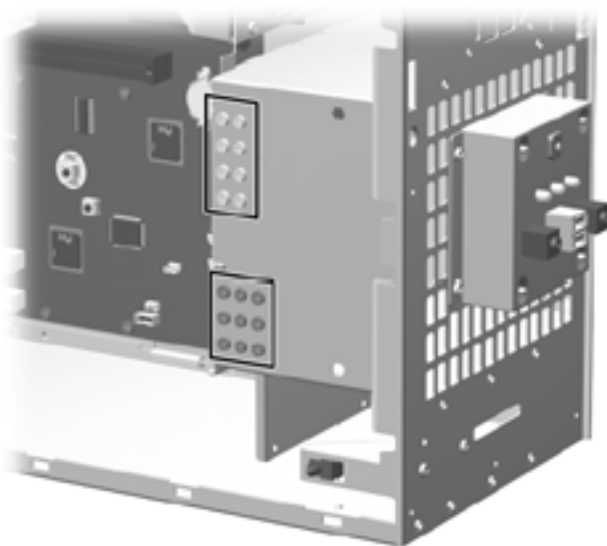


Removing a cooling shield

5. Replace the cooling shield after the drive is installed in the bay.
To replace the cooling shield, reverse the previous procedure.

Locating the Hardware Screws

A total of 17 extra hardware screws are provided on the side of the air plenum. The top group of 8 screws are standard 6-32 $\times$ 3/16-inch long screws and are for installing the hard drives. The bottom group of 9 screws are metric M-3 $\times$ 5mm long and are for installing removable media storage devices in the front drive bays.



Locating the hardware screws for drive bay installations

Installing a Drive

Installing a hard Drive in Bays 5 and 6

Drive bays 5 and 6 can be configured with either 1.0-inch or 1.6-inch hard drives. Other than using different screw holes, the installation for both drives is basically the same.



CAUTION: Use only 3/16-inch guide screws. Longer screws can damage the internal components of the drive.



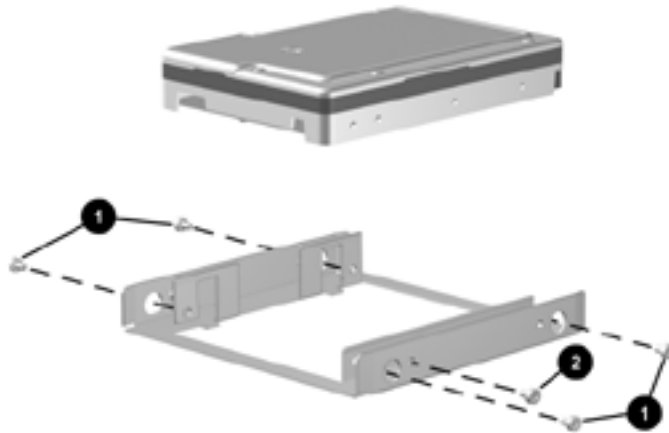
If you are installing an Ultra ATA device, see “Guidelines for Installing Ultra ATA Devices” in Appendix B.

If you are installing a SCSI device, see “SCSI Devices” in Appendix B.

To install a hard drive in bay 5 or 6:

1. Shut down the operating system properly, then turn off the workstation and any external devices. Disconnect the power cord from the grounded AC outlet.
2. Remove the workstation access panel. See “Removing the Workstation Access Panel” in this chapter.

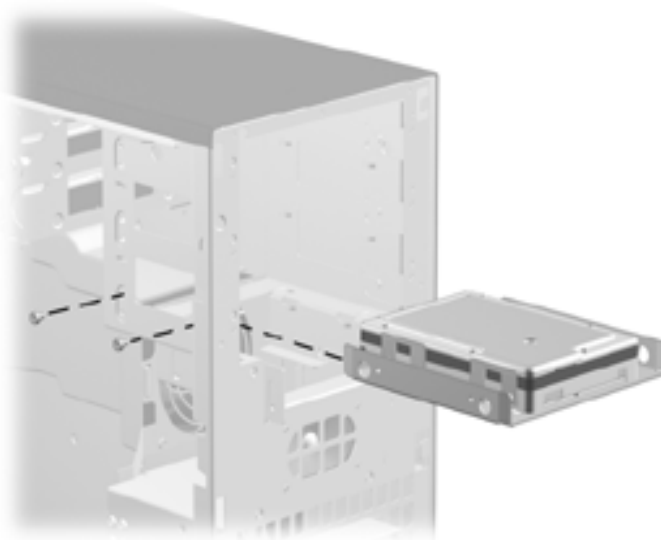
3. Remove the front bezel. See “Removing the Front Bezel” in this chapter.
4. Remove the cooling shield. See “Removing the Cooling Shield” in this chapter.
5. To install a hard drive in bay 5 or bay 6 see the following four illustrations.



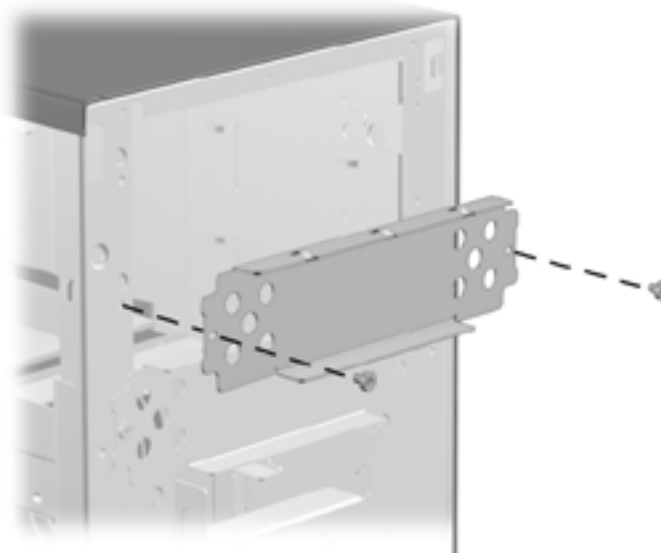
Installing a hard drive in the hard drive adapter



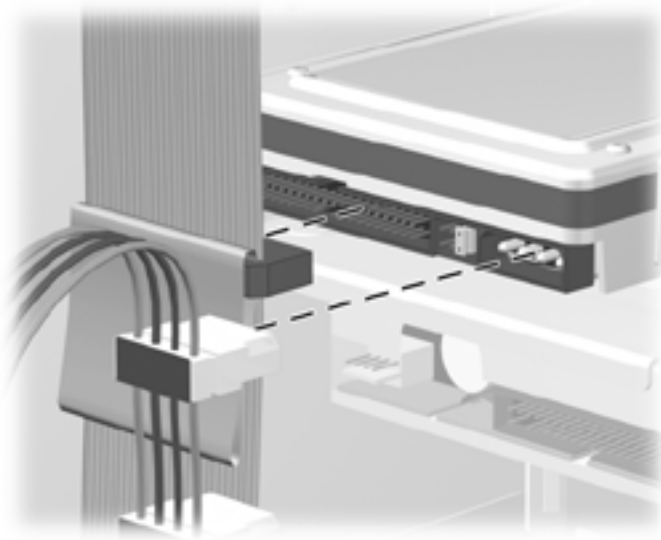
Use only 3/16-inch long screws for both the adapter screws 1 and the guide screw 2. Longer screws can damage the internal components of the drive.



Installing a hard drive into the chassis



Replacing the cooling shield



Connecting the UATA signal cable and power cable

6. Connect the opposite ends of the cables to the appropriate system board connectors. To locate the appropriate drive connectors, see “System Board Components” in Chapter 1.
7. Reassemble the workstation.

Reverse the previous procedures to remove a hard drive from bay 5 or bay 6.

Installing a Hard Drive in the Removable Hard Drive Cage (Bays 1 to 3)

The removable hard drive cage can be configured with up to three 1.0-inch hard drives or two 1.6-inch hard drives. Other than using different screw holes, the installation for both types of drives is basically the same.



Prior to installing a SCSI device, see “SCSI Devices” in Appendix B.

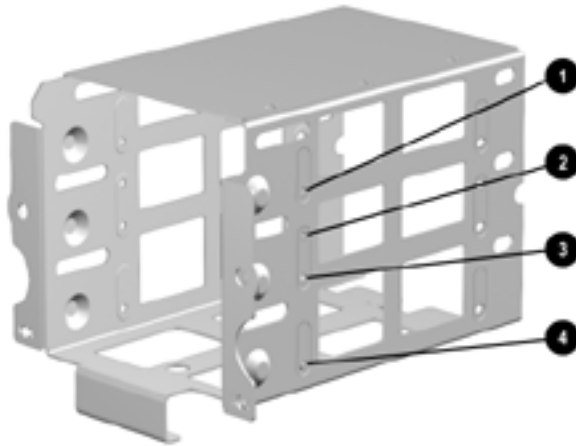
To install a hard drive in the removable hard drive cage:

1. Shut down the operating system properly, then turn off the workstation and any external devices. Disconnect the power cord from the grounded AC outlet.
2. Remove the workstation access panel. See “Removing the Workstation Access Panel” in this chapter.
3. Remove the removable hard drive cage. See “Removing and Replacing the Removable Hard Drive Cage” in this chapter.
4. Remove four of the hard drive screws (top group of screws) from the side of the air plenum located at the front of the workstation. See “Locating the Hardware Screws” in this chapter.



If only one SCSI hard drive is used, install it in bay 2.

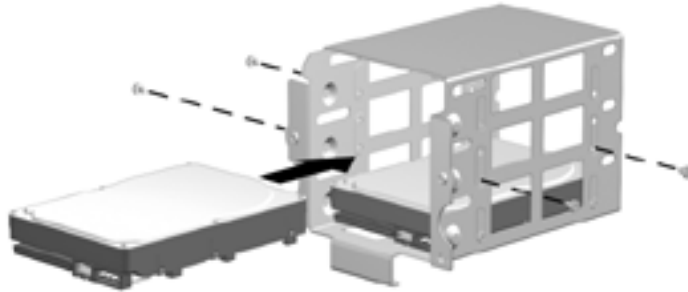
5. Install the screws into the drive cage. See the following illustration for screw locations.



Locating the hard drive screw holes

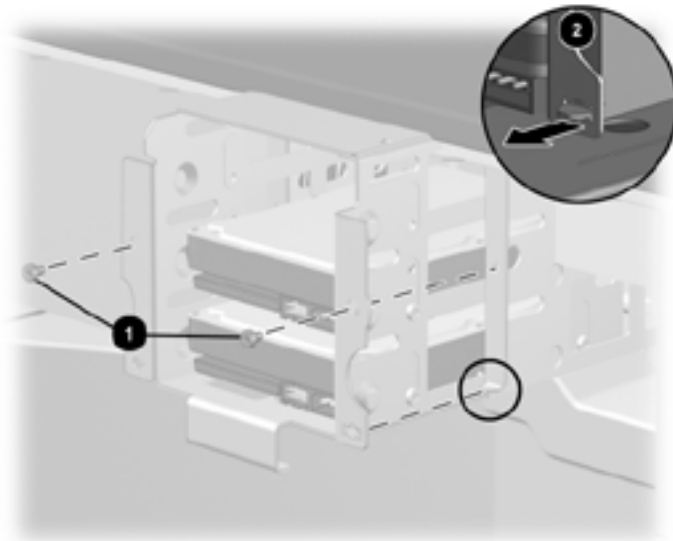
- ❶ 1.0-inch drive
- ❷ 1.6-inch drive
- ❸ 1.0-inch drive
- ❹ 1.0-inch or 1.6-inch drive

6. To install an optional hard drive in the removable hard drive cage, see the following three illustrations.

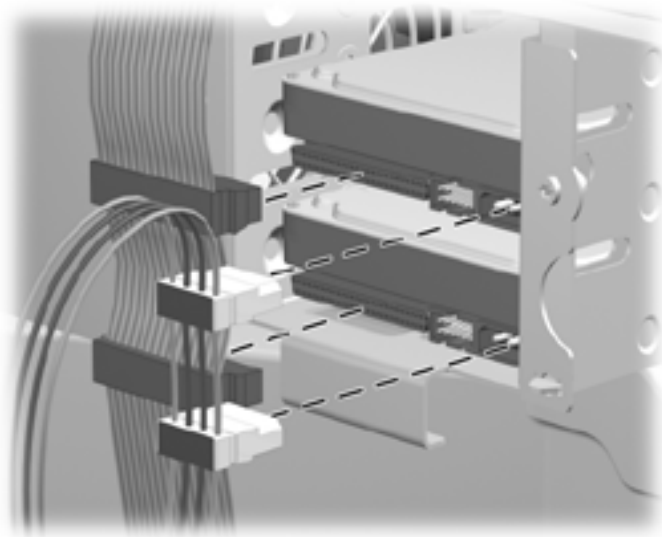


Installing a hard drive in bay 2

CAUTION: Use only standard 6-32x3/16-inch guide screws. Longer screws can damage the internal components of the drive.



Reinstalling the removable hard drive cage.



Connecting the SCSI signal cables and power cables

7. Connect the ends of the cables to the appropriate system board connectors. To locate the appropriate drive connectors, see “System Board Components” in Chapter 1.
8. Reassemble the workstation.

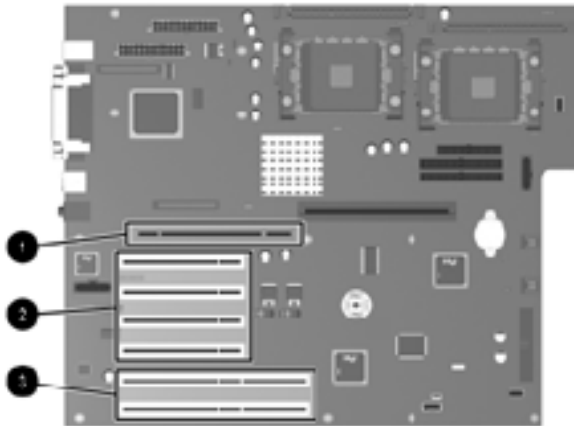
Reverse the previous procedure to remove a drive from the removable hard drive cage

Installing and Removing an Expansion Board

This section provides instructions for installing and removing PCI and AGP expansion boards.

Identifying the PCI and AGP Sockets

This workstation contains one AGP socket and six PCI sockets. The following illustration identifies the physical locations of these sockets.



Identifying AGP and PCI sockets

- ❶ One 1.5V AGP Pro socket
- ❷ Four 32-bit, 33-MHz PCI sockets; primary bus
- ❸ Two 64-bit, 66-MHz PCI sockets; secondary bus

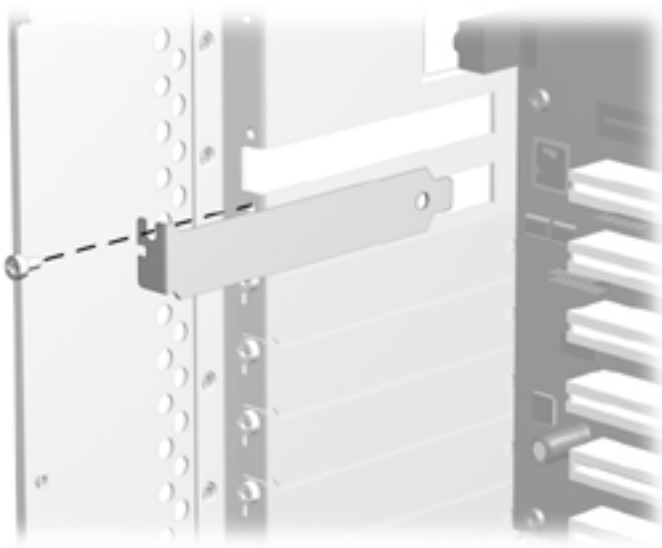


Evo Workstation W8000 supports 4X AGP Pro cards only. Older type AGP cards (3.3V) are not supported and will NOT fit in the AGP socket.

Installing an Expansion Board

To install an expansion board:

1. Shut down the operating system properly, then turn off the workstation and any external devices. Disconnect the power cord from the grounded AC outlet.
2. Remove the workstation access panel. See “Removing the Workstation Access Panel” in this chapter.
3. Locate a vacant PCI or AGP socket, depending on the type of board you are installing.
4. Remove the screw securing the expansion slot cover, then remove the slot cover, as illustrated.



Removing the screw and expansion slot cover

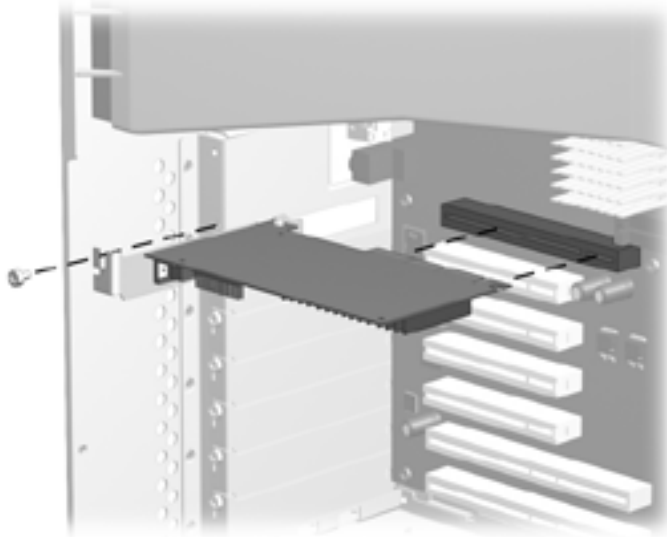
5. Slide the expansion board into the socket. Press firmly on the board so that the board seats properly in the socket.



If you are installing a full-length expansion board, make sure to engage the card guide.

AGP Pro Specifications allow an AGP expansion board (with additional components or PCI expansion boards attached) to occupy up to two adjacent PCI sockets on your workstation system board.

6. Replace the screw to secure the board in the expansion slot.



Installing an expansion board

7. Reassemble the workstation.
8. Reconfigure the workstation, if necessary.

Removing an Expansion Board

Reverse the steps in the previous section to remove an expansion board. When reversing these steps:

- Be sure to store the board in antistatic packaging.
- Install an expansion slot cover to close the open slot.

Installing an Additional Processor

You can upgrade your workstation to a multiprocessor system. When you install a second processor, it must be the same speed, cache size, and type as the existing processor.



WARNING: To reduce the risk of personal injury from hot surfaces, allow the internal system components to cool before touching them.



CAUTION: Installing the processor incorrectly may cause damage to the system board. Have a Compaq authorized reseller or service provider install the processor. If you choose to install it yourself, read all of the instructions carefully before you begin.

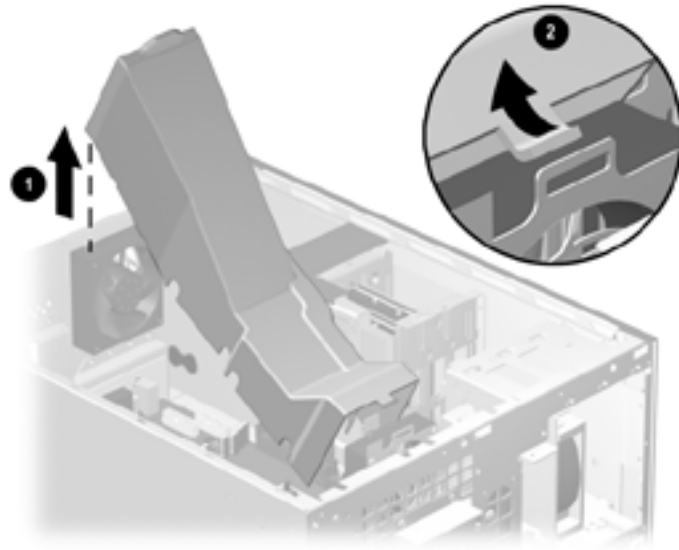


CAUTION: Static electricity can damage the electronic components of the workstation. Before beginning these procedures, be sure that you are discharged of static electricity by briefly touching a grounded metal object.

To install a second processor:

1. Shut down the operating system properly, then turn off the workstation and any external devices. Disconnect the power cord from the grounded AC outlet.
2. Remove the workstation access panel. See “Removing the Workstation Access Panel” in this chapter.
3. Remove the memory expansion board. See “Removing the Memory Expansion Board” in this chapter.
4. Disconnect the cables from the hard drive and move them away from the processor area.

5. Remove the air baffle:
 - a. Grasp the air baffle at both ends.
 - b. Rotate the end of the air baffle in an upward direction ❶.
 - c. Pull the air baffle tab out of the front fan bracket ❷.
 - d. Lift the air baffle out of the chassis.



Removing the air baffle

6. Install the second processor:



CAUTION: If only one processor is installed and you are replacing that processor, be sure to install the processor in the primary processor socket or your workstation will not function.

- a. Open the processor socket by pulling up on the processor retention lever ❶.

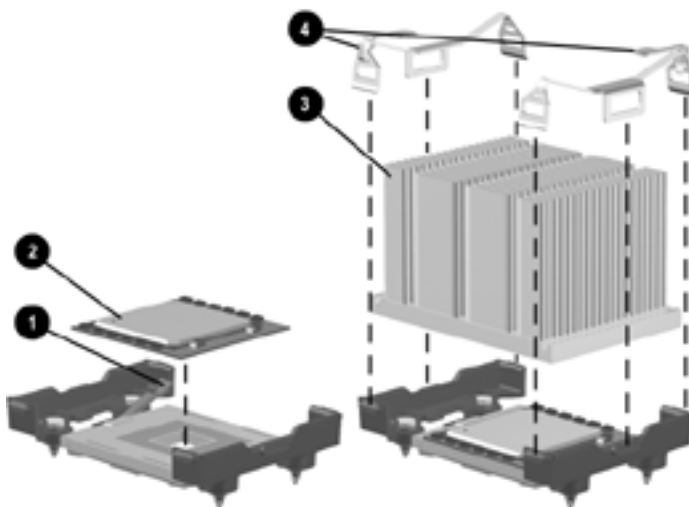


CAUTION: Processor pins are delicate and bend easily. Use extreme care when placing the processor in the socket.

- b. Insert the new processor ❷ and close the retention lever.
- Ensure that the processor is locked into place and is not loose in the socket.
- c. Ensure the thermal pad is on the bottom of the heatsink ❸ before setting the heatsink on top of the processor.
- d. Install the two metal clips ❹ that hold the heatsink to the processor retention module.



Ensure that the metal clips are firmly attached to the retaining tabs.



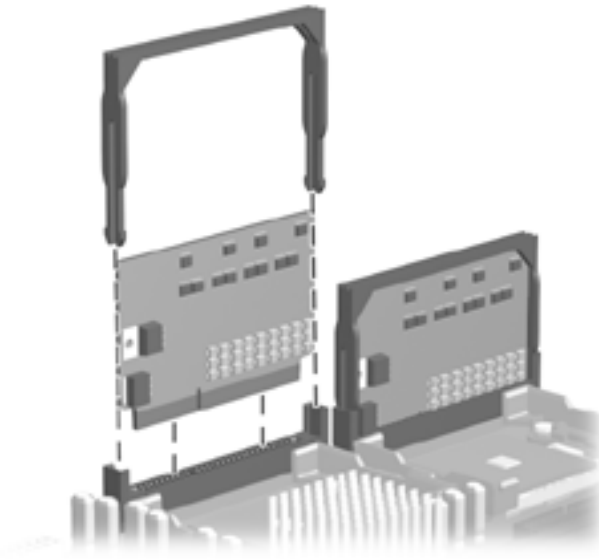
Installing a second processor

7. Install the Voltage Regulator Module (VRM):
 - a. Ensure that the VRM board is fully inserted and properly seated.



CAUTION: You must install a Compaq approved VRM board when installing a second processor. Using a VRM board that is incompatible with the primary VRM board may severely or permanently damage the system board.

- b. Install the VRM clip, ensuring that the clip snaps into place.



Installing a second VRM board and clip

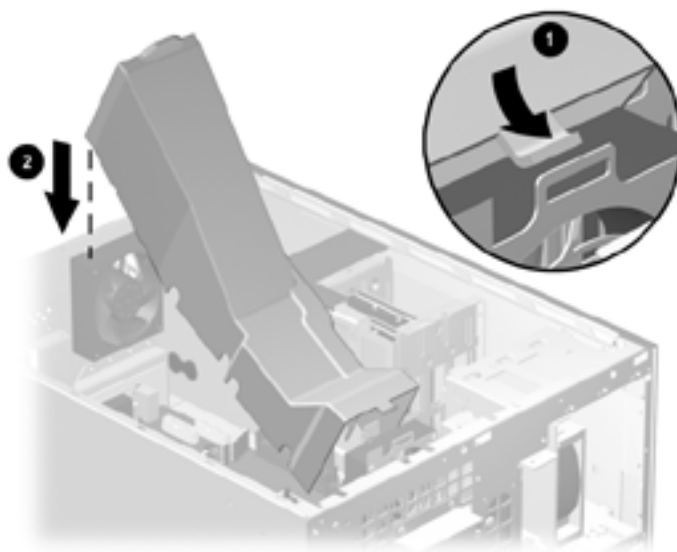
8. Reinstall the air baffle:
 - a. Slide the baffle tab through the front fan bracket ❶.
 - b. Carefully rotate the air baffle downwards ❷ until it is fully seated.



CAUTION: The air baffle is essential to proper cooling of the processors. Without it, the processors will slow down to avoid overheating.



Air flows across the processors from front to back. The front fan moves air over the processors while the back fan pulls the air out of the chassis.



Reinstalling the air baffle

9. Reattach the hard drive cables.



CAUTION: If only one processor is installed and you are replacing that processor, be sure to install the processor in the primary processor socket or your workstation will not function.

10. Reinstall the memory expansion board. See “Reinstalling the Memory Expansion Board” in this chapter.
11. Reassemble the workstation.

When replacing the workstation access panel, be sure to tighten all four thumbscrews.



A manual Hardware Abstraction Layer (HAL) upgrade is necessary when installing a second processor **after** the system has gone through the software unbundling process. If a second processor is installed prior to unbundling, a manual upgrade is **not** necessary. Compaq recommends that the software unbundling process be completed prior to installing additional components. For information on upgrading to a multiprocessor HAL, refer to the documentation included in your processor upgrade kit.

Upgrading a Processor

You can upgrade your workstation by replacing an existing processor with a faster processor. Before replacing an existing processor, you will need to purchase the necessary hardware option kit. Follow the guidelines and procedures provided in the following sections to upgrade your processor.

Preparing for a Processor Upgrade



WARNING: To reduce the risk of personal injury from hot surfaces, allow the internal system components to cool before touching them.



CAUTION: Installing the processor incorrectly may cause damage to the system board. Have a Compaq authorized reseller or service provider install the processor. If you choose to install it yourself, read all of the instructions carefully before you begin.



CAUTION: Static electricity can damage the electronic components of the workstation or optional equipment. Before beginning these procedures, ensure that you are discharged of static electricity by briefly touching a grounded metal object.

Hardware Components Required

To upgrade your processor, contact your Compaq authorized service provider to purchase the necessary hardware option kit. This kit should contain the following:

- Processor
- Alcohol swab
- Heatsink with thermal pad
- Heatsink retainer clips
- Voltage Regulator Module (VRM)

Guidelines for Separating the Heatsink/Processor Assembly

Before upgrading your workstation with a new processor, the following sequential events must take place in order to remove the existing heatsink and processor assembly:

1. The heatsink and processor assembly need to be heated to an optimum temperature to break the compound bonding them together. See the following sections:
 - ☐ “Heatsink Cool-Down Time”
 - ☐ “Heatsink Warm-Up Time”
2. The heatsink must be separated from the processor.
3. The processor must be released from the processor socket.

Heatsink Cool-Down Time

The heat generated from the processor core transfers to the heatsink making the assembly too hot to handle. From a power-on state to a power-off state, it takes 13 minutes to cool the heatsink sufficiently so that it can be handled comfortably while the compound holding it to the processor remains pliable.

Heatsink Warm-Up Time

Minimal warm-up time is required to generate enough heat to soften the compound holding the heatsink to the cold processor.



CAUTION: Lifting the heatsink straight up while it is in a cold state can result in damage to the processor, because it may prematurely pull the heatsink and processor assembly out of the processor socket. If this should occur, you will need to open the processor socket, by lifting up on the processor retention lever, before attempting to install the new processor.

From a power-off state to a power-on state, see the following steps to warm (but not overheat) the heatsink so that the heatsink can be handled comfortably while the compound holding it to the processor is still pliable.

1. Turn on the workstation and allow the operating system to boot.
2. Shut down the operating system properly, then turn off the workstation and any external devices. Disconnect the power cord from the grounded AC outlet.

Removing an Existing Processor

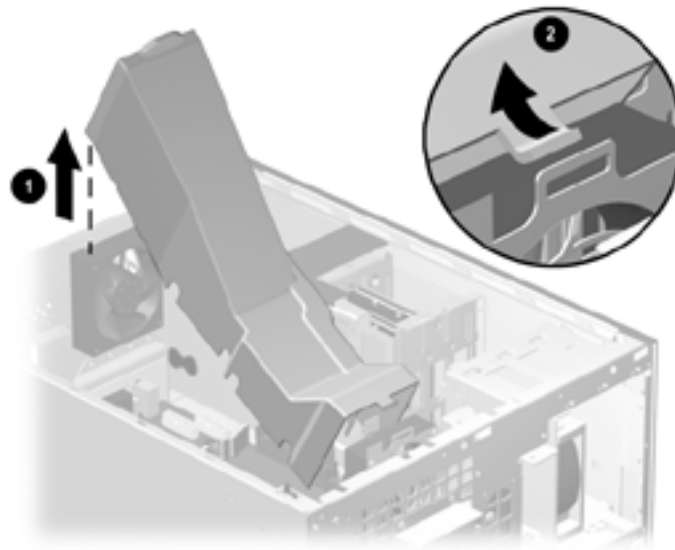


Before attempting this procedure, read the “Guidelines for Separating the Heatsink/Processor Assembly” instructions in this chapter.

To remove an existing processor:

1. Shut down the operating system properly, then turn off the workstation and any external devices. Disconnect the power cord from the grounded AC outlet.
2. Remove the workstation access panel. See “Removing the Workstation Access Panel” in this chapter.
3. Remove the memory expansion board. See “Removing the Memory Expansion Board” in this chapter.

4. Disconnect the cables from the hard drive and move them away from the processor area.
5. Remove the air baffle:
 - a. Grasp the end of the air baffle seated at the rear of the chassis.
 - b. Rotate the end of the baffle in an upward direction ❶.
 - c. Pull the baffle tab out of the front fan bracket ❷.
 - d. Lift the baffle out of the chassis.



Removing the air baffle

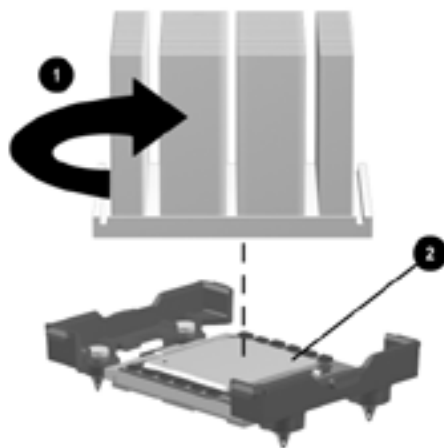
6. Ensure that the heatsink is warm to the touch.



CAUTION: Lifting the heatsink straight up while it is in a cold state can result in damage to the processor because it may prematurely pull the heatsink and processor assembly out of the processor socket. If this should occur, you will need to open the processor socket by lifting up on the processor retention lever, before attempting to install the new processor.

If the heatsink is cold to the touch, see “Guidelines for Separating the Heatsink/Processor Assembly” in this chapter.

7. Remove the heatsink:
 - a. Release the two metal clips that hold the heatsink to the processor retention module.
 - b. Twist the heatsink slightly ❶ to break the compound that holds it to the processor.
 - c. Lift the heatsink off the processor ❷.



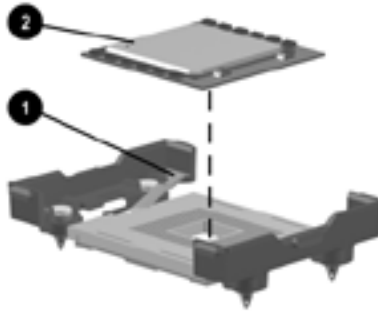
Twisting and lifting the heatsink off the processor



CAUTION: Lifting the heatsink straight up while it is in a cold state can result in damage to the processor, because it may prematurely pull the heatsink and processor assembly out of the processor socket. If this should occur, you will need to open the processor socket, by lifting up on the processor retention lever, before attempting to install the new processor.

If the heatsink is cold to the touch, see “Guidelines for Separating the Heatsink/Processor Assembly” in this chapter.

8. Remove the processor:
 - a. Open the processor socket by pulling up on the processor retention lever ❶.
 - b. Lift the processor out of the processor socket ❷.



Removing the processor

Installing a New Processor

To install a new processor, see the “Installing an Additional Processor” section in this chapter.

Disabling Onboard Devices

Before installing an option, you may have to disable another component such as:

- Soundblaster
- NIC
- SCSI controller

For example, if you add a sound card, you might need to disable the Soundblaster device on the system board to prevent conflicts. To completely disable an onboard component, look under Security → Device Security in the F10 Setup during boot.

Specifications

Evo Workstation W8000

Component	U.S.	Metric
Dimensions		
Height	17.8 in	45.21 cm
Width	8.03 in	20.40 cm
Depth	23.3 in	59.18 cm
Approximate Weight	48.00 lb	21.77 kg
Power Supply	115 VAC	230 VAC
Operating Voltage Range	90-132 VAC	180-264 VAC
Rated Voltage Range	100-127 VAC	200-250 VAC
Rated Line Frequency	50-60 Hz	50-60 Hz
Temperature		
Operating	50° to 95°F	10° to 35°C
Shipping	4° to 140°F	-15° to 60°C
Humidity (noncondensing)		
Operating	20% to 80%	
Nonoperating	10% to 90%	
Maximum Altitude (unpressurized)		
Operating	10,000 ft	3,048 m
Nonoperating	30,000 ft	9,144 m
Power Output	500 W	500 W
Rated Input Current (maximum)	8.6 A	4.3 A
Heat Dissipation (maximum)	2641 BTU/hr	665 kg-cal/hr

Hard Drive Installation

Using the Cable-Select Feature with Ultra ATA Devices

Selected models of the Evo Workstation W8000 have an internal Ultra ATA hard drive installed. The configuration of the drive employs a cable-select feature that identifies the drive as device 0 (primary drive) or device 1 (secondary drive).

Device 1 is the drive connected to the cable's middle connector. Device 0 is the drive connected to the cable's end connector (applies only to 80-conductor ATA cables). See "Guidelines for Installing Ultra ATA Devices" in this appendix for an example of an Ultra ATA cable.

Compaq hard drives ship with jumpers preset to cable-select mode; therefore, no jumper setting changes on the existing or optional drives are required. If you purchase a third-party hard drive, refer to the documentation included with the kit to ensure proper installation and configuration of cables.



If you are installing a second device on the primary controller, you must use an 80-conductor Ultra ATA cable for optimum performance. This cable is standard on selected models.

Guidelines for Installing Ultra ATA Devices

When installing additional Ultra ATA drives, follow these guidelines:

- If using multiple Ultra ATA devices, Compaq recommends that the devices be split between the primary and secondary Ultra ATA channels for optimum performance. Use an additional Ultra ATA cable to connect the additional device(s) to the system board.
- UATA-100 cable:
 - ❑ 18 inches maximum total length, 80-conductor cable with maximum spacing of 6 inches between Drive 0 and Drive 1.



UATA-100 cable

- ① Device 0 (primary drive) connector
 - ② Device 1 (secondary drive) connector
 - ③ System board connector
- For optimum performance, connect hard drives to the primary controller. Connect expansion devices, such as Ultra ATA CD-ROM drives, tape drives, and diskette drives, to the secondary controller (white connector on Evo Workstation W8000).
 - Install either a third-height or a half-height drive into a half-height bay.
 - Install guide screws to ensure that the drive lines up correctly in the drive cage. Compaq has provided extra guide screws installed in the front of the workstation chassis behind the front bezel. Some options use M3 metric hardware. Compaq-supplied metric screws are black.
 - If only one device is connected to a cable, that device must be attached to the end (Device 0) connector.

SCSI Devices

This section contains information relating to SCSI device guidelines and installation.

Guidelines for Using SCSI Devices

When installing and operating SCSI devices, follow these guidelines:

- A single Ultra SCSI controller supports up to seven SCSI devices per channel.
- Each Wide-Ultra SCSI, Ultra-Wide SCSI, Wide Ultra2 SCSI, Ultra 320 SCSI, or Ultra 160 SCSI controller supports up to 15 SCSI devices per channel.
- If you are using multiple SCSI devices, Compaq recommends that the devices be split between Channel A and Channel B, if available, for optimum performance.
- Compaq recommends the following SCSI cable:
 - ❑ 53 inches maximum length twisted-pair, LVD cable with built-in terminator, maximum of 5 drives with a minimum drive spacing of 5.25 inches
- The SCSI controller requires a unique SCSI ID (0-7 or 8-15) for each SCSI device installed. The controller identifies a SCSI device by its SCSI ID number rather than by its location. Moving a SCSI device from one position to another on the SCSI chain does not affect communication between the controller and the device. The reserved and available SCSI ID numbers for SCSI devices are:
 - ❑ 0—reserved for the primary hard drive
 - ❑ 7—reserved for the controller
 - ❑ 1 through 6 and 8 through 15—available for all other SCSI devices
- Either a CD-ROM or DVD-ROM is shipped in bay 4.

- Every SCSI chain or circuit must be terminated (closed) at both ends. Some system boards have both ends of the SCSI cable connected to, and terminated by, the system board. Termination can be accomplished through one of the following methods:
 - ❑ Using a cable with a built-in terminator. This cable was shipped with your workstation.
 - ❑ Using a cable with a terminating resistor plug in the last connector.
 - ❑ Connecting a SCSI device with its termination enabled into the last connector.
 - ❑ Connecting an external SCSI device with its termination enabled to the external SCSI connector on the rear panel of the computer.
- Turn on all external SCSI devices before turning on the power to the computer. This action enables the SCSI controller to recognize the external devices.
- The system accommodates a combination of internal and external SCSI devices, such as hard drives, tape drives, and CD-ROM drives.
- Compaq does not recommend mixing different-width SCSI devices on the same SCSI chain or on the same SCSI channel. Mixing devices of different widths on the same chain or channel will always result in the data transfer rate of the slowest device in that chain. It is acceptable to mix Wide-Ultra2, Ultra 160, and Ultra 320 devices on a single channel. Do not put narrow devices on a channel with any device type other than another narrow device.

For additional information about optional SCSI devices, refer to the documentation included with the device or contact your Compaq authorized dealer, reseller, or service provider.



CAUTION: Do not route cables near the air intake to the power supply. Cables routed in this manner can block airflow to the power supply, causing it to overheat.

Guidelines for Installing SCSI Devices



If you mix Ultra ATA and SCSI hard drives in the same system, the Ultra ATA drive will be the boot drive unless the boot order is changed in the F10 Setup.

When replacing a hard drive, the replacement drive should be of the same type as the drive being removed. If you are replacing an Ultra ATA hard drive with a SCSI hard drive, you will need a multimode LVD SCSI cable option kit.

If only one SCSI hard drive is used, it should be installed in bay 2.

Before installing a SCSI device:

- Verify the SCSI ID of the drive and, if necessary, set the SCSI ID to a unique number. See “Guidelines for Using SCSI Devices” in this appendix or refer to the documentation included with the device.
- Determine if the device requires that termination be enabled or disabled. Set the termination if necessary. See “Using a SCSI Cable” in this appendix or refer to the documentation included with the device.

SCSI Controllers

Your workstation ships with an integrated dual channel SCSI controller. Channel A has one internal SCSI connector on the system board. Channel B has two connectors: one internal SCSI connector on the system board and one external SCSI connector on the rear panel of the workstation.

SCSI Cables

The removable hard drive cage and front drive bays are available for installing or connecting mass storage SCSI devices.

Using a SCSI Cable

Selected models of the Evo Workstation W8000 ship with a multimode SCSI cable that supports Low Voltage Differential (LVD) or single-ended devices (UATA models do not have the SCSI cable).

The Evo Workstation W8000 ships with a LVD cable that supports up to five SCSI devices. The cable accommodates up to three SCSI devices in the removable hard drive cage and two in the front drive bay area. Some Evo Workstation W8000 models ship with an internal SCSI drive installed in the front drive bay area. You can add additional high-performance SCSI drives using the external SCSI connector located on the rear panel of the workstation.



Five-device SCSI cable with terminator



The cable that shipped with your workstation may look different than the one illustrated (a five-device cable).

If you are installing a narrow SCSI device, you will need to attach a 68-pin to a 50-pin SCSI adapter.

For additional information about installing optional SCSI devices, refer to the documentation included with the device option kit, or contact your Compaq authorized dealer, reseller, or service provider.

Using SCSISelect with SCSI Devices

The SCSI host adapter includes the *SCSISelect* utility to configure the host adapter and to run SCSI disk utilities. To run the *SCSISelect* utility:

- In POST Messages Enabled mode: Press **Ctrl + A** when the Press <Ctrl><A> for *SCSISelect* Utility message displays during POST.
- In POST Messages Disabled mode: When the Compaq logo screen displays, press any key to exit the logo screen. Immediately after exiting the logo screen, press **Ctrl + A** to access the *SCSISelect* utility.

A menu displays with the following options:

- Configure/View Host Adapter Settings
 - ☐ SCSI Bus Interface Definitions
 - ◆ Host Adapter SCSI ID
 - ◆ SCSI Parity Checking
 - ◆ Host Adapter SCSI Termination
 - ☐ Additional Options
 - ◆ Boot Device Options
 - ◆ SCSI Device Configuration
 - ◆ Advanced Configuration Options
- SCSI Disk Utilities
 - ☐ Lists all SCSI devices and SCSI ID numbers



For additional information about configuring POST message display status, refer to the *Computer Setup Guide* on the *Reference Library* CD.

Battery Replacement

Replacing the Battery

The battery that comes with your computer provides power to the real-time clock and has a lifetime of about three to five years. When replacing the battery, use an equivalent 3-volt lithium coin cell battery. A replacement battery may be purchased at your local retailer or from the Compaq.com Web site.



The spare part number for a standard coin cell battery is 153099-001, which corresponds to a CR2032 battery or equivalent.



WARNING: Your computer contains an internal lithium manganese dioxide, vanadium pentoxide, or alkaline battery or battery pack. There is a risk of fire and burns if the battery pack is not handled properly. To reduce the risk of personal injury:

- Do not attempt to recharge the battery.
 - Do not expose the battery to temperatures higher than 140°F (60°C).
 - Do not disassemble, crush, puncture, short external contacts, or dispose of the battery in fire or water.
 - Replace the battery only with the Compaq spare designated for this product.
-



CAUTION: Static electricity can damage the electronic components of the workstation or optional equipment. Before beginning these procedures, ensure that you are discharged of static electricity by briefly touching a grounded metal object.



Batteries, battery packs, and accumulators should not be disposed of together with the general household waste. To forward them to recycling or proper disposal, please use the public collection system or return them to Compaq, their authorized partners, or their agents.

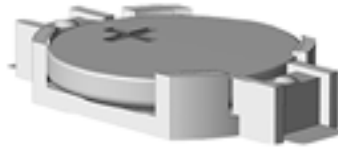
To replace the battery:

1. Shut down the operating system properly, turn off the computer and any external devices, disconnect the power cord from the electrical outlet, and remove the computer cover or access panel.



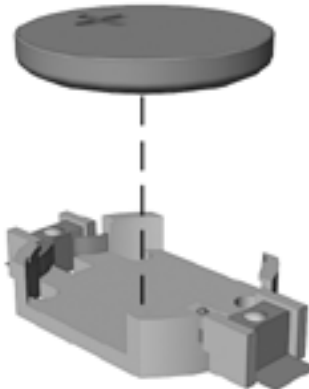
It may be necessary to remove an expansion card to gain access to the battery.

2. Locate the battery and battery holder on the system board, as shown in the following illustration.



Battery and battery holder

3. Lift the battery out of its holder.



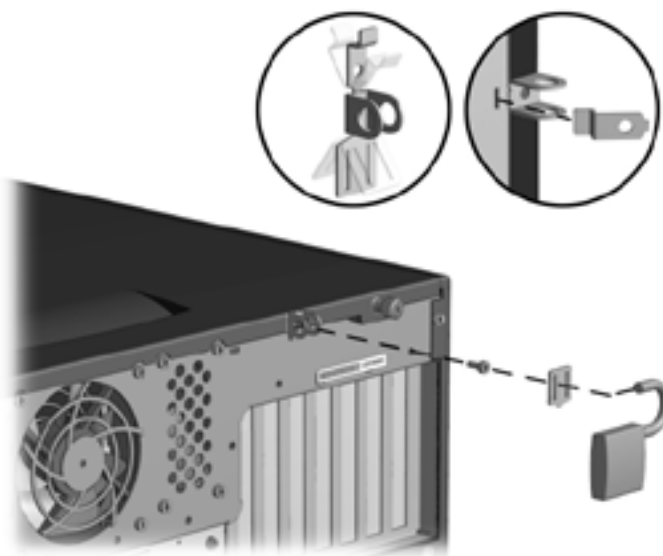
Removing the coin cell battery

4. Slide the replacement battery into position, positive side up. The battery holder automatically secures the battery in the proper position.
5. Replace any expansion boards you removed.
6. Replace the computer cover or access panel.
7. Plug in and turn on the computer.
8. Reset the date and time, your passwords, and any special system setups, using Compaq Computer Setup. Refer to the *Computer Setup Guide* on the *Reference Library* CD for additional information.

Security Lock Provisions

Installing a Cable Lock

The cable lock is an optional device used to help secure the workstation. Because of differences between chassis, the slot may be located in a different position than shown.



Securing the workstation

1. Separate the pieces of the security bracket by bending the metal where the three pieces join.

2. Insert the tang (tongue) of the narrow bracket into the slot on the chassis, and slide the U-shaped security bracket between the tang and the system unit cover. Next install the self-tapping screw included in the cable lock kit.
3. Cover the screw with the flat bracket.
4. Install a lock (not provided) in the security bracket to control access to the inside of the workstation. Install a cable lock (not provided) to secure the workstation to a fixed object.

Electrostatic Discharge

A discharge of static electricity from a finger or other conductor may damage system boards or other static-sensitive devices. This type of damage may reduce the life expectancy of the device.

Preventing Electrostatic Damage

To prevent electrostatic damage, observe the following precautions:

- Avoid hand contact by transporting and storing products in static-safe containers.
- Keep electrostatic-sensitive parts in their containers until they arrive at static-free workstations.
- Place parts on a grounded surface before removing them from their containers.
- Avoid touching pins, leads, or circuitry.
- Always be properly grounded when touching a static-sensitive component or assembly.

Grounding Methods

Several methods for grounding are available. Use one or more of the following methods when handling or installing electrostatic-sensitive parts:

- Use a wrist strap connected by a ground cord to a grounded workstation or computer chassis. Wrist straps are flexible straps with a minimum of 1 megohm +/-10 percent resistance in the ground cords. To provide proper ground, wear the strap snugly against the skin.
- Use heelstraps, toestraps, or bootstraps at standing workstations. Wear the straps on both feet when standing on conductive floors or dissipating floor mats.
- Use conductive field service tools.
- Use a portable field service kit with a folding static-dissipating work mat.



If you do not have any of the suggested equipment for proper grounding or if you need for more information about static electricity, contact your Compaq authorized dealer, reseller, or service provider.

Routine Computer Care and Shipping Preparation

Routine Computer Care

Follow these suggestions to take care of your computer and monitor:

- Operate the computer on a sturdy, level surface. Leave a 3-inch (7.6-cm) clearance at the back of the system unit and above the monitor to permit the required airflow.
- Never operate the computer with the cover or side panel removed.
- Never restrict the airflow into the computer by blocking the front vents or air intake. Do not place the keyboard, with the keyboard feet down, directly against the front of a unit that is in a desktop configuration because this also restricts airflow.
- Keep the computer away from excessive moisture, direct sunlight, and extremes of heat and cold. For information about the recommended temperature and humidity ranges for your computer, see to Appendix A, “Specifications,” in this guide.
- Keep liquids away from the computer and keyboard.
- Never cover the ventilation slots on the monitor with any type of material.
- Turn off the computer properly before you do either of the following:
 - ❑ Wipe the exterior of the computer with a soft, damp cloth as needed. Using cleaning products may discolor or damage the finish.
 - ❑ Occasionally clean the air vents on the front and back of the computer. Lint and other foreign matter can block the vents and limit the airflow.

CD-ROM Drive Precautions

Be sure to observe the following guidelines while operating or cleaning your CD-ROM drive.

Operation

- Do not move the drive during operation. This may cause it to malfunction during reading.
- Avoid exposing the drive to sudden changes in temperature, because condensation may form inside the unit. If the temperature suddenly changes while the drive is on, wait at least one hour before you turn off the power. If you operate the unit immediately, it may malfunction while reading.
- Avoid placing the drive in a location that is subject to high humidity, extreme temperatures, mechanical vibration, or direct sunlight.

Cleaning

- Clean the panel and controls with a soft, dry cloth or a soft cloth lightly moistened with a mild detergent solution. Never spray cleaning fluids directly on the unit.
- Avoid using any type of solvent.

Safety

If any object or liquid falls into the drive, immediately unplug the computer and have it checked by an authorized Compaq service provider.

Shipping Preparation

Follow these suggestions when preparing to ship your computer:

1. Back up the hard drive files onto PD discs, tape cartridges, or diskettes. Be sure that the backup medium is not exposed to electrical or magnetic impulses while stored or in transit.



The hard drive locks automatically when the system power is turned off.

2. Remove and store any program diskettes that are located in the diskette drives.
3. Insert a blank diskette into the diskette drive to protect the drive while in transit. Do not use a diskette on which you have stored or plan to store data.
4. Turn off the computer and external devices.
5. Disconnect the power cord from the electrical outlet and then from the computer.
6. Disconnect the system components and external devices from their power sources and then from the computer.



Ensure that all boards are seated properly and secured in the board sockets before shipping the computer.

7. Pack the system components and external devices in their original packing boxes or similar packaging with sufficient packing material to protect them.



For environmental nonoperating ranges, see Appendix A, “Specifications,” in this guide.

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